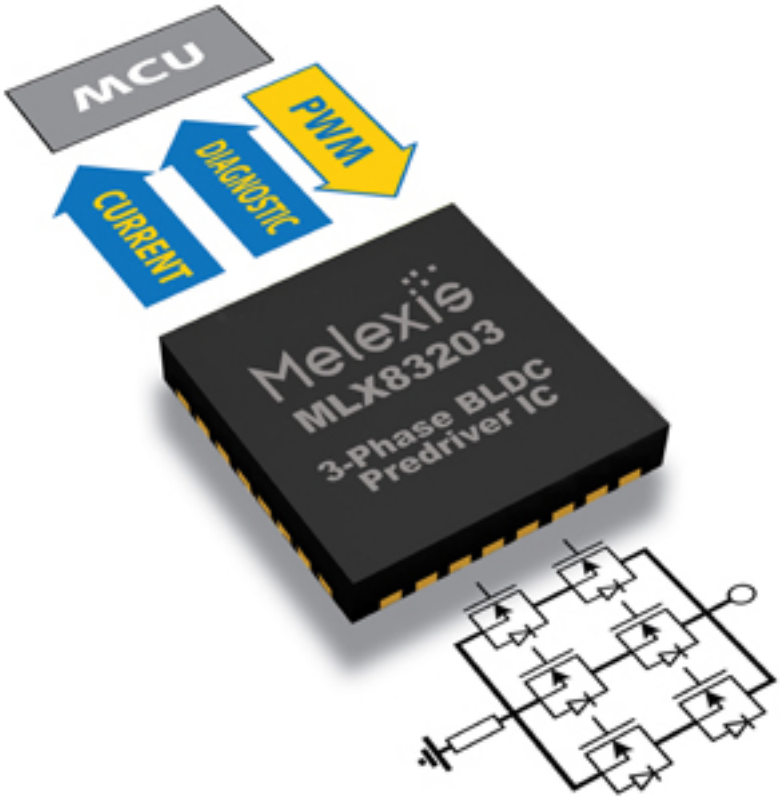
IC reduces footprint & increases operating range for 3 phase BLDC motor control



3 phase brush-less DC (BLDC) motor applications bring higher efficiency and improved performance to electromechanical actuation in automotive systems like pumps, power steering, engine cooling fans and fast positioning drivetrain actuators. Melexis latest pre-driver IC, the MLX83203, deploys EEPROM memory and combined bootstrap and charge pump blocks. Whereas traditional BLDC pre-driver ICs require complex, large packages with many external components, the MLX83203 delivers a flexible pre-driver solution in a space saving, standard, QFN32 5x5 package.

The IC drives six 250nC NFETS up to 25kHz, while keeping 10V gate voltage down to 7V battery voltage. In line with the needs for such failsafe torque control applications, the MLX83203 features extensive diagnostics as well as a high speed, low noise amplifier. Rather than configuring the pre-driver by applying external resistors, 6 bytes of on-chip EEPROM offer wide-ranging configuration options while minimizing pin count.

The low self heating and small pin count means that the MLX83203 presents the smallest footprint for comparable 3 phase pre-drivers on the market. The benefit is a smaller finished size, fewer components and more flexibility for design re-use. Additional family members are planned for release in the coming months. The MLX83203 will be released for operation up to 150°C and qualification to 175°C is planned for the near future. Further members of this product family will support medium current capability and DC motor control.

The wide operating voltage range from 4.5V to 28V, plus bootstrap topology complemented with a charge pump stage, allow operation of the power stage via standard level NFETs without loss of performance during stop/start conditions, as well as enable control even during engine cranking. The charge pump can be configured for applying a high side NFET reverse polarity protection. In sleep mode the IC consumes less than 30µA standby current. A 10MHz gain bandwidth product (GBW) delivers shunt amplifier settling times of less than 1µs for fast current feedback. Its gain can be programmed in a wide range from 8 up to 48, and the input range can be configured from fully symmetric to full scale. The power stage (VDS, VGS) as well as all input voltages are monitored with comparators to offer maximum system level diagnostics. A high speed serial interface provides detailed diagnostics feedback to the microcontroller.

Thanks to its wide configurability and high operating temperature, the pre-driver family, in addition to power steering systems, can be applied to engine cooling fans, blowers, water/oil/fuel pumps, drive train position actuators and wipers. The family will include 3 phase BLDC pre-drivers, as well as 2 phase pre-drivers for brushed DC applications. Package options include wettable flanks QFN, TQFP and TSSOP, all with exposed pad.

Production will be released in Q1 2013, and final samples are available through the standard Melexis sales channels. For more information please visit: www.melexis.com/MLX83203 [1].

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Links:
[1] http://www.melexis.com/MLX80203